

National Parks and Historic Sites



Parcs nationaux et lieux historiques

*Review of Piping Plover (*Charadrius Melodus*)
Monitoring Data in Prince Edward Island
National Park (1980-1996)*

Edited by Suzanne M. Barnes and Stephen P. Flemming

August, 2000

Report 05

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Parks Canada - Ecosystem Monitoring and Data Reports 05

Review of Piping Plover (*Charadrius melodus*) Monitoring Data in Prince Edward Island National Park (1980-1996).

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Canadian Cataloguing in Publication Data

Barnes, Suzanne, 1967-

**Review of piping plover (*Charadrius melodus*) monitoring data
in Prince Edward Island National park (1980-1996)**

(Parks Canada - Ecosystem monitoring and data reports ; 05)

Includes an abstract in French.

Includes bibliographical references.

ISBN 0-662-28408-9

Cat. no. R61-2/20-5-2000E

**1. Piping plover -- Prince Edward Island -- Prince Edward Island
National Park.**

**2. Bird populations -- Prince Edward Island -- Prince Edward
Island National Park.**

I. Flemming, Stephen Peter, 1962-

II. Parks Canada. Atlantic Region.

III. Series.

QL696.C43B37 2000

598.33

C00-980005-0

ACKNOWLEDGEMENTS

The authors acknowledge the years of support and assistance provided to the Piping Plover monitoring programme at Prince Edward Island National Park by Gary N. Corbett, Regional Wildlife Biologist and Charlie Ristau, Assistant Chief Park Warden PEINP; as well as the many Piping Plover monitors that have inventoried the birds over the years. Linda Thomas is also gratefully acknowledged for taking the time to read an earlier draft of this report.

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ABSTRACT

Piping Plover monitoring data collected in Prince Edward Island National Park (PEINP) from 1980-96 were verified with original field sheets. Summary statistics from these corrected data are presented. Overall, the number of breeding pairs in PEINP appears to have declined over the 16 year time period. Nest success varied from 93.1% to 10.7 %, and hatching success ranged from 90.4% to 9.0 % in the same period. Fledging success has been determined for age 20 and 25 days. At age 25, fledging success ranged from 2.33 chicks/pair to 0.32 chicks/pair (1980-96). These corrected data are available on disk, and are ideal for use in status assessment.

RÉSUMÉ

Les données d'observation du pluvier siffleur recueillies dans le parc national de l'Île-du-Prince-Édouard (PNIPE) de 1980 à 1996 ont fait l'objet d'une vérification au moyen des relevés originaux pris sur le terrain. Des statistiques sommaires fondées sur ces données corrigées sont présentées dans la présente. Dans l'ensemble, les données indiquent que le nombre de couples reproducteurs dans le PNIPE aurait diminué au cours de la période de 16 ans. Le taux de succès de nidification a varié de 93,1% à 10,71% et le taux de succès d'éclosion a varié de 90,4% durant la même période. Les taux de succès d'envol des oisillons ont été déterminés à 20 et à 25 jours. À 25 jours, le taux de succès d'envol variait de 2,33 poussins par couple à 0,32 poussin par couple (1980-1996). Ces données corrigées sont disponibles sur disquette, et se prêtent très bien à l'évaluation de l'état de la population,

INTRODUCTION

The Piping Plover data set for Prince Edward Island National Park (PEINP) is presented for 1980-96. This report reviews and standardizes the nesting, hatching, and fledging success data collected in PEINP, archives it, and makes it available to interested individuals and agencies. The population of single adults is not addressed here because it is nearly impossible to discern single adults in an unmarked population. There have been observations of single birds but a complete count is difficult because they are highly mobile, especially over the course of the breeding season. Nest failures often result in re-assortment of mating pairs. Hence, this report specifically documents annual variation in nesting, hatching, and fledging success.

This report summarizes what is believed to be the longest running data set for a single study area throughout the Piping Plover's range (Flemming, 1992). As such, it can yield valuable information on population dynamics that are sparsely available in the literature. Furthermore, these data are essential for assessing the population viability of the Atlantic Canada population. Finally, this standardized and corrected data lends itself to comparison of population demographics throughout the species range, as well as furthering conservation initiatives for the species.

VERIFICATION OF DATA

The 1980-91 data was verified by S. Flemming (1992), who also provided summary statistics. The data from 1992-96 was verified by S. Barnes, standardized, and summarised in the same way. Both data sets

were then combined in a Quattro Pro spreadsheet format, archived using Parks Canada standards, and summarized to assess annual variation in nesting, hatching, and fledging success.

Data were verified by reviewing the field notes of Piping Plover monitors and checking the data with what was presented in the annual summary reports. In most cases, the data in the field notes were self explanatory but occasionally the daily summary sheets were also consulted to assist in understanding the context of field notes. Note-taking has improved significantly since the first review by Flemming (1992).

DEFINITIONS

The number of breeding pairs is defined as the maximum number of simultaneously territorial pairs assessed over a biologically significant time period (at least a week).

Fledging success at 20 days is defined as the number of chicks that survived 20 days divided by the number of breeding pairs at the beach location.

Fledging success at 25 days is defined as the number of chicks that survived 25 days divided by the number of breeding pairs at the beach location.

A fostered nest is defined as one in which eggs that were rescued from a flooded or abandoned nest were subsequently placed with a nesting pair that recently lost their nest, and were either still territorial; or were placed with a pair that was still territorial and were incubating a nest of clay eggs (provided by plover monitors).

Fostered eggs are defined as eggs that were added to an existing nest to make a full clutch of 4 eggs.

Hatching success is defined as the number of eggs that hatched divided by the number of eggs laid, at a beach location, where the outcome was known. This is expressed as a percentage.

Nest success is defined as the number of nests that produced at least one hatched egg (i.e., produced a chick) divided by the number of nests at a beach location, where the outcome was known. This is expressed as a percentage.

Total hatching success includes fostered eggs at a beach location.

OVERVIEW OF DATA SET

Provided is an overview of the 16-year data set (i.e., means, ranges) for Piping Plover productivity at PEINP. Throughout the study period, a variety of management techniques and levels of effort have been used. For more detail on these efforts and discussion of results one should review the annual reports on file at PEINP, and Flemming (1992).

In considering summary statistics, we found that the number of breeding pairs has varied from a low of 12 in 1995 to a high of 27 in 1983 (Table 1). Overall, the number of breeding pairs appears to be declining in recent years at PEINP.

Nest success has varied from 93.1 % in 1983 to 10.7% in 1993. Variation in nest success was most often due to storm events that washed out nests. Three major storms

in 1993 resulted in the lowest nest success recorded in PEINP (10.7%).

Hatching success ranged from 90.4% in 1983 to 9.0% in 1993; fledging success at 20 days ranged from 2.50 chicks/pair in 1983 to 0.48 chicks/pair (or 0.57 chicks/pair if successful fostered eggs are included) in 1993; and similarly fledging success at 25 days ranged from 2.33 chicks/pair in 1983 to 0.32 in 1993 (Tables 2 to 18). These success rates fluctuated due to variation in nest success as well as other causes, such as predation.

Over the 1980-96 period, a total of 581 nests were located with 574 having a known outcome - 202 (35.19%) of those were successful (Table 19). Seven hundred and thirty-eight of 2038 eggs, of known outcome, hatched for an overall success rate of 36.2% (Table 19). Overall fledging success for this period at 20 days is 1.63 chicks/pair, while at 25 days, success is 1.33 chicks/pair (Table 20). These rates are above the 1.245 chicks/pair required to maintain the population (USFWS population viability assessment for east coast of NA; USFWS, 1996).

From 1980-96, flooding of Piping Plover nests was the most common reason for egg loss at 37.5%, predation was the second most important known cause of egg loss at 24.9%, and abandonment was third at 15.3% of eggs lost (Table 21). To summarize, these data provide a great potential to examine variation in demographics for population viability analysis as well as for causes of demographic stochasticity.

RECOMMENDATIONS

The collection of Piping Plover monitoring data in a standardized format continue in order to meet our obligations under the National Parks Act and the intent of future Endangered Species legislation. The Canadian Wildlife Service, Atlantic Region is a repository for Piping Plover information and PEINP should continue to forward its annual reports to this Department.

Table 1. Annual variation in the number of breeding pairs of Piping Plovers per year in Prince Edward Island National Park (1980-96)³.

Beach name	Year																	Maximum
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
Blooming Pt	8	5	7	9	6	7	6	6	4	3	5	7	4	4	3	1	0	9
Tracadie Hbr	-	-	-	-	-	-	-	1(-1)	1	-	-	-	-	-	-	-	-	1
Dalvay east	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Covehead	1	3	1	2	2	3(-1)	2	6(-2)	5	1	1	2	6	3	3	4	5	6
Shaw's	-	-	-	-	-	-	-	1(-1)	1	1	-	0	-	-	1	-	-	1
Brackley Bch.	-	-	1	-	-	3	1	-	-	-	-	-	-	-	-	-	-	3
Brackley Mn Bch	-	-	-	-	-	1	1(-1)	1	-	-	-	-	-	-	-	-	-	1
Rustico Is. Causeway	2	0	2	5	7	5(-2)	4	5	5	7	3	4	3	2	2	3	3	7
Rustico Is. Sandspit	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2
North Rustico Bch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	1
Cavendish Mn Bch	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Cavendish Sandspit	8	7	7	9	4	3	3	6(-1)	8	7	7	9	7	11	5	2	5	11
Total	20	17	20	27	21	20	17	22	25	20	17	23	21	21	16	12	14	27

³Numbers in brackets indicate the number of pairs that moved from one Park beach to another (Flemming, 1992).

Table 2. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1980 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	6	2	2	100.0	21	7	7	100.0
Covehead	1	1	1	100.0	1	1	1	100.0
Rustico Island Causeway	1	1	1	100.0	4	3	3	100.0
Rustico Island Sandspit	1	0	0	0.0	4	1	0	0.0
Cavendish Sandspit	9	7	5	71.4	33	25	20	80.0
Total	18	11	9	81.8	63	37	31	83.8

Table 3a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1981 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	7	7	2	28.6	19	19	5	26.3
Covehead	3	3	2	66.7	9	9	7	77.8
Rustico Island Sandspit	2	2	0	0.0	8	8	0	0.0
Cavendish Sandspit	15	15	7	46.7	54	54	25	46.3
Total	27	27	11	40.7	90	90	37	41.1

Table 3b. Piping Plover fledging success in Prince Edward Island National Park in the 1981 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	5	5	4	0.80	5	4	0.80
Covehead	3	3	6	2.00	3	6	2.00
Rustico Island Sandspit	2	2	0	0.00	2	0	0.00
Cavendish Sandspit	7	7	15	2.14	7	15	2.14
Total	17	17	25	1.47	17	25	1.47

Table 4. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1982 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	8	8	6	75.0	31	31	24	77.4
Dalway East	1	1	1	100.0	4	4	4	100.0
Covehead	1	1	1	100.0	4	4	4	100.0
Brackley Beach	1	1	1	100.0	4	1	1	100.0
Rustico Island	2	2	2	100.0	8	8	8	100.0
Causeway								
Rustico Island Sandspit	1	1	1	100.0	4	4	4	100.0
Cavendish Sandspit	13	13	5	38.5	51	51	19	37.3
Total	27	27	17	63.0	106	103	64	62.1

Table 5a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1983 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	9	9	9	100.0	35	35	35	100.0
Covehead	2	2	2	100.0	8	8	7	87.5
Rustico Island Causeway	5	5	5	100.0	20	20	19	95.0
Rustico Island Sandspit	2	2	2	100.0	8	8	8	100.0
Cavendish Sandspit	12	11	9	81.8	47	44	35	79.5
Total	30	29	27	93.1	118	115	104	90.4

Table 5b. Piping Plover fledging success in Prince Edward Island National Park in the 1983 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	9	7	20	2.86	5	12	2.40
Covehead	2	1	4	4.00	1	4	4.00
Rustico Island Causeway	5	2	1	0.50	2	1	0.50
Rustico Island Sandspit	2	1	4	4.00	1	4	4.00
Cavendish Sandspit	9	9	21	2.33	9	21	2.33
Total	27	20	50	2.50	18	42	2.33

Table 6a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1984 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of nests - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	12	12	5	41.7	44	44	18	40.9
Covehead	3	3	2	66.7	12	12	7	58.3
Rustico Island Causeway	12	12	1	8.3	43	43	4	9.3
Rustico Island Sandspit	1	1	0	0.0	4	4	0	0.0
Cavendish Sandspit	5	5	1	20.0	15	15	4	26.7
Total	33	33	9	27.3	118	118	33	28.0

Table 6b. Piping Plover fledging success in Prince Edward Island National Park in the 1984 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	6	5	16	3.20	0	0	0.00
Covehead	2	2	7	3.50	2	2	1.00
Rustico Island Causeway	7	6	0	0.00	6	0	0.00
Rustico Island Sandspit	1	1	0	0.00	1	0	0.00
Cavendish Main Beach	1	1	0	0.00	1	0	0.00
Cavendish Sandspit	4	3	0	0.00	3	0	0.00
Total	21	18	23	1.28	13	2	0.15

Table 7. Piping Plover nests and hatching success in Prince Edward Island National Park in the 1985 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	14	14	3	21.4	56	56	11	19.6
Covehead	6	6	1	16.7	22	22	4	18.2
Brackley Main Beach	1	1	0	0.0	4	4	0	0.0
Brackley Beach	3	3	0	0.0	12	12	0	0.0
Rustico Island Causeway	6	6	1	16.7	19	19	4	21.1
Rustico Island Sandspit	1	1	1	100.0	4	4	4	100.0
Cavendish Sandspit	3	3	1	33.3	11	11	4	36.4
Total	34	34	7	20.6	128	128	27	21.1

Table 8a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1986 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	10	10	4	40.0	33	33	12	36.4
Covehead	2	2	1	50.0	8	8	4	50.0
Brackley Main Beach	1	1	0	0.0	1	1	0	0.0
Brackley Beach	1	1	0	0.0	4	4	0	0.0
Rustico Island Causeway	9	9	2	22.2	32	32	8	25.0
Rustico Island Sandspit	2	2	1	50.0	7	7	4	57.1
Cavendish Sandspit	3	3	1	33.3	12	12	4	33.3
Total	28	28	9	32.1	97	97	32	33.0

Table 8b. Piping Plover fledging success in Prince Edward Island National Park in the 1986 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	6	4	5	1.25	3	3	1.00
Covehead	2	2	4	2.00	2	4	2.00
Brackley Beach	1	1	0	0.00	1	0	0.00
Rustico Island Causeway	4	3	3	1.00	2	0	0.00
Rustico Island Sandspit	1	1	2	2.00	1	1	1.00
Cavendish Sandspit	3	3	2	0.67	3	2	0.67
Total	17	14	16	1.14	12	10	0.83

Table 9a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1987 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	11	11	1	9.1	41	41	4	9.8
Tracadie Harbour	1	1	0	0.0	3	3	0	0.0
Covehead	7	7	5	71.4	28	28	17	60.7
Brackley Main Beach	1	1	0	0.0	1	1	0	0.0
Shaw's Beach	1	1	1	100.0	4	4	3	75.0
Rustico Island Causeway	13	13	1	7.7	40	40	4	10.0
Rustico Island Sandspit	1	1	1	100.0	4	4	3	75.0
Cavendish Sandspit	8	8	6	75.0	32	32	24	75.0
Total	43	43	15	34.9	153	153	55	35.9

Table 9b. Piping Plover fledging success in Prince Edward Island National Park in the 1987 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	6	5	0	0.00	5	0	0.00
Tracadie Harbour	1	0	0	0.00	0	0	0.00
Covehead	6	4	10	2.50	3	6	2.00
Shaw's Beach	1	1	2	2.00	1	2	2.00
Brackley	1	1	0	0.00	1	0	0.00
Rustico Island Causeway	5	5	4	0.80	5	4	0.80
Rustico Island Sandspit	1	1	2	2.00	1	2	2.00
Cavendish Sandspit	6	5	20	4.00	5	20	4.00
Total	27	22	38	1.73	21	34	1.55

Table 10a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1988 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	10	10	1	10.0	30	30	3	10.0
Tracadie Harbour	1	1	1	100.0	4	4	4	100.0
Covehead	9	9	0	0.0	27	27	0	0.0
Shaw's Beach	1	1	0	0.0	4	4	0	0.0
Rustico Island Causeway	12	12	4	33.3	39	39	14	35.9
Rustico Island Sandspit	2	2	1	50.0	8	8	4	50.0
Cavendish Sandspit	22	22	7	31.8	80	80	25	31.3
Total	57	57	14	24.6	192	192	50	26.0

Table 10b. Piping Plover fledging success in Prince Edward Island National Park in the 1988 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	4	4	3	0.75	4	3	0.75
Tracadie Harbour	1	1	4	4.00	1	4	4.00
Covehead	5	5	0	0.00	5	0	0.00
Shaw's Beach	1	1	0	0.00	1	0	0.00
Rustico Island Causeway	5	4	10	2.50	4	10	2.50
Rustico Island Sandspit	1	1	1	1.00	1	1	1.00
Cavendish Sandspit	8	7	21	3.00	6	17	2.83
Total	25	23	39	1.70	22	35	1.59

Table 11a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1989 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	7	7	2	28.6	22	22	7	31.8
Covehead	3	3	1	33.3	9	9	4	44.4
Shaw's Beach	1	1	0	0.0	3	3	0	0.0
Rustico Island Causeway	14	14	2	14.3	42	42	6	14.3
Rustico Island Sandspit	2	2	0	0.0	8	8	0	0.0
Cavendish Sandspit	18	18	6	33.3	61	61	24	39.3
Total	45	45	11	24.4	145	145	41	28.3

Table 11b. Piping Plover fledging success in Prince Edward Island National Park in the 1989 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	3	3	4	1.33	3	4	1.33
Covehead	1	1	4	4.00	1	1	1.00
Shaw's Beach	1	1	0	0.00	1	0	0.00
Rustico Island Causeway	7	7	2	0.29	7	2	0.29
Rustico Island Sandspit	1	1	0	0.00	1	1	1.00
Cavendish Sandspit	7	7	14	2.00	5	6	1.20
Total	20	20	24	1.20	18	14	0.78

Table 12a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1990 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	5	5	4	80.0	20	20	15	75.0
Covehead	1	1	1	100.0	4	4	4	100.0
Rustico Island Causeway	4	4	0	0.0	16	16	0	0.0
Rustico Island Sandspit	2	2	1	50.0	7	7	3	42.9
Cavendish Sandspit	11	11	7	63.6	32	32	23	71.9
Total	23	23	13	56.5	79	79	45	57.0

Table 12b. Piping Plover fledging success in Prince Edward Island National Park in the 1990 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging succ/pair (25 days)
Blooming Point	5	5	13	2.60	5	5	1.00
Covehead	1	1	4	4.00	1	1	1.00
Rustico Island Causeway	3	3	0	0.00	3	3	1.00
Rustico Island Sandspit	1	0	0	0.00	0	0	0.00
Cavendish Sandspit	7	7	20	2.86	6	19	3.17
Total	17	16	37	2.31	15	28	1.87

Table 13a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1991 breeding season.

Location	Number of nests located	Number of nests - outcome known	Number of successful nests	Percent nest success	Number of eggs	Number of nests - outcome known	Number of eggs successfully hatched	Percent hatching success
Blooming Point	12	12	3	25.0	48	48	10	20.8
Covehead	3	3	2	66.7	12	12	8	66.7
Rustico Island Causeway	10	10	2	20.0	36	36	6	16.7
Rustico Island Sandspit	2	2	1	50.0	8	8	4	50.0
Cavendish Sandspit	27	27	6	22.2	98	98	22	22.4
Total	54	54	14	25.9	202	202	50	24.8

Table 13b. Piping Plover fledging success in Prince Edward Island National Park in the 1991 breeding season.

Location	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	7	0	0	0.00	0	0	0.00
Covehead	2	2	5	2.50	1	2	2.00
Rustico Island Causeway	4	4	4	1.00	3	0	0.00
Rustico Island Sandspit	1	1	3	3.00	0	0	0.00
Cavendish Sandspit	9	9	16	1.78	8	12	1.50
Total	23	16	28	1.75	12	14	1.17

Table 14a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1992 breeding season.

Beach	Number of nests	Number of nests fostered	Number of successful nests	Percent nest success	Number of successful nest fostered	Total Percent nest success	Number of eggs fostered	Number of eggs hatched	Percent hatching success	Number of fostered eggs hatched	Total Percent hatching success
Blooming Point	8	0	4	50	0	50	30	14	46.67	0	46.67
Covehead ⁴	8	1	1	12.5	1	22.22	31	4	12.90	4	22.86
Rustico Island Causeway	5	0	1	20	0	20	20	4	20.00	0	20.00
Rustico Island Sandspit	1	0	0	0	0	0	4	0	0.00	0	0.00
Cavendish Sandspit ⁵	9	0	6	66.67	0	66.67	35	24	68.57	0	68.57
Total	31	1	12	38.71	1	40.63	120	46	38.33	4	40.32

⁴ Covehead nest counts are one less than stated in the monitoring report because one was a fostered nest, as noted in the table.

⁵ Eggs are -1 from the monitoring report because a third egg could not be verified as existing at one nest. The eggs that were fostered were counted twice - once where they were laid and once where they were fostered to. Fledging success is -5 from the report because the report includes 2 fostered and 2 captive reared plover. Two captive reared chicks were released at Rustico Island Causeway, fledged 20 and 25. days. As well, one chick at Cavendish Sandspit could not be verified.

Table 14b. Piping Plover fledging success in Prince Edward Island National Park in the 1992 breeding season (Nesting pair-based on counts May 29*).

Beach	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging Success/ pair (20 days)	Number of chicks fostered (20 days)	Total Fledging Success/ pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging Success/ pair (25 days)	Number of fostered chicks (25 days)	Total Fledging Success/ pair (25 days)
Blooming Point	4	4	10	2.50	0	2.50	4	9	2.25	0	2.25
Covehead	6	6	2	0.33	2	0.67	6	2	0.33	2	0.67
Rustico Island Causeway	3	3	4	1.33	0	1.33	3	4	1.33	0	1.33
Rustico Island Sandspit	1	1	0	0.00	0	0.00	1	0	0.00	0	0.00
Cavendish Sandspit	7	7	22	3.14	0	3.14	7	21	3.00	0	3.00
Total	21	21	38	1.81	2	1.90	21	36	1.71	2	1.81

Table 15a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1993 breeding season.

Beach	Number of nests	Number of nests fostered	Number of successful nests	Percent nest success	Number of successful nests fostered	Total Percent nest success	Number of eggs fostered	Number of eggs hatched	Percent hatching success	Number of fostered eggs hatched	Total Percent hatching success
Blooming Point	14	0	0	0	0	0	40	0	0.00	0	0.00
Covehead ⁶	11	0	3	27.27	0	27.27	35	8	22.86	3	28.95
Rustico Island Causeway	6	0	0	0	0	0	18	0	0.00	0	0.00
Rustico Island Sandspit	1	0	1	100	0	100	4	3	75.00	0	75.00
Cavendish Sandspit	24	0	2	8.33	0	8.33	80	5	6.25	0	6.25
Total	56	0	6	10.71	0	10.71	177	16	9.04	3	10.56

⁶The egg count at Covehead is -3 from the 1993 report as the eggs were counted at Cavendish Sandspit but then fostered to a nest at Covehead. Nesting pair differs from the annual report as the report states the number for the entire season while the nesting pairs are based on counts from the week ending June 19. The report states that no data on the fledging success at 25 days is available for Covehead; however, data on 3 of the 9 chicks exists and is stated in the table, the other 6 were not followed until 25 days after hatching.

Nesting pair based on counts on June 19.

Table 15b. Piping Plover fledging success in Prince Edward Island National Park in the 1993 breeding season.

Beach	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success (20 days)	Number of fostered chicks (20 days)	Total Fledging success (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days) ⁷	Fledging success (25 days)	Number of fostered chicks (25 days)	Total Fledging success (25 days)
Blooming Point	4	4	0	0.00	0	0.00	4	0	0.00	0	0.00
Covehead	3	3	7	2.33	2	3.00	1	3	3.00	0	3.00
Rustico Island Causeway	2	2	0	0.00	0	0.00	2	0	0.00	0	0.00
Rustico Island Sandspit	1	1	0	0.00	0	0.00	1	0	0.00	0	0.00
Cavendish Sandspit	11	11	3	0.30	0	0.27	11	3	0.30	0	0.27
Total	21	21	10	0.50	2	0.57	21	6	0.33	0	0.33

⁷Data unavailable for remaining 6 chicks on Covehead.

Table 16a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1994 breeding season.

Beach	Number of nests	Number of nests fostered	Number of successful nests	Percent nest success	Number of successful nest fostered	Total Percent nest success	Number of eggs	Number of eggs fostered	Number of eggs hatched	Percent hatching success	Number of fostered eggs hatched	Total Percent hatching success
Blooming Point	3	0	0	0	0	0	12	0	0	0.00	0	0.00
Covehead	3	0	2	66.67	0	66.67	12	0	8	66.67	0	66.67
Shaw's	1	0	1	100	0	100	4	0	4	100.00	0	100.00
Rustico Island Causeway	2	0	2	100	0	100	8	0	7	87.50	0	87.50
Rustico Island Sandspit	1	0	1	100	0	100	4	0	4	100.00	0	100.00
North Rustico	1	0	1	100	0	100	4	0	3	75.00	0	75.00
Cavendish Sandspit	14	1	1	7.14	0	6.67	48	4	4	8.33	0	7.69
Total	25	1	8	32	0	30.77	92	4	30	32.61	0	31.25

Table 16b. Piping Plover fledging success in Prince Edward Island National Park in the 1994 breeding season^a.

Beach	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/ pair (20 days)	Number of fostered chicks (20 days)	Total fledging success/ pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/ pair (25 days)	Number of fostered chicks (25 days)	Total fledging success/ pair (25 days)
Blooming Point	3	3	0	0.00	0	0.00	3	0	0.00	0	0.00
Covehead	3	3	5	1.67	0	1.67	3	5	1.67	0	1.67
Shaw's	1	1	4	4.00	0	4.00	1	4	4.00	0	4.00
Rustico Island Causeway	2	2	3	1.50	0	1.50	2	2	1.00	0	1.00
Rustico Island Sandspit	1	1	1	1.00	0	1.00	1	1	1.00	0	1.00
North Rustico	1	1	3	3.00	0	3.00	1	2	2.00	0	2.00
Cavendish Sandspit	5	5	0	0.00	0	0.00	5	0	0.00	0	0.00
Total	16	16	16	0.94	0	0.94	16	14	0.82	0	0.82

^aThe fostered nest is not noted but is included in this year's summary tables. The Cavendish Sandspit egg count includes the four that were fostered and a possible miss-count of 1 egg (1 egg variation unexplained). The nesting pair vary from the 1994 report because the report states the number over the entire season, not the nesting pairs on June 24 and the period June 19-24.

Table 17a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1995 breeding season.

Beach	Number of nests	Number of nests fostered	Number of successful nests	Percent nest success	Number of successful nest fostered	Total Percent nest success	Number of eggs	Number of eggs fostered	Number of eggs hatched	Percent hatching success	Number of fostered eggs hatched	Total Percent hatching success
Blooming Point	1	0	0	0	0	0	4	0	0	0.00	0	0.00
Covehead	5	1	3	60	1	66.7	20	5	11	55.00	4	60.00
Rustico Island Causeway	5	0	3	60	0	60	20	0	11	55.00	0	55.00
Rustico Island Sandspit	2	0	0	0	0	0	8	0	0	0.00	0	0.00
North Rustico	2	0	1	50	0	50	5	0	4	80.00	0	80.00
Cavendish Sandspit	8	0	1	12.5	0	12.5	23	2	2	8.70	2	16.00
Total	23	1	8	34.78	1	37.75	80	7	28	35.00	6	39.08

Table 17b. Piping Plover fledging success in Prince Edward Island National Park in the 1995 breeding season^a
(Nesting pairs based on July 9 counts).

Beach	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/ pair (20 days)	Number of fostered chicks (20 days)	Total Fledging success /pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/ pair (25 days)	Number of fostered chicks (25 days)	Total Fledging success /pair (25 days)
Blooming Point	1	1	0	0.00	0	0.00	1	0	0.00	0	0.00
Covehead	4	4	11	2.75	1	3.00	4	10	2.50	1	2.75
Rustico Island Causeway	3	3	6	2.00	0	2.00	3	5	1.67	0	1.67
Rustico Island Sandspit	1	1	0	0.00	0	0.00	1	0	0.00	0	0.00
North Rustico	1	1	4	4.00	0	4.00	1	4	4.00	0	4.00
Cavendish Sandspit	2	2	2	1.00	0	1.00	0	unk	unk	0	0.00
Total	12	12	23	1.92	1	2.00	12	19	1.58	1	1.67

^aThe 1995 report does not note the fostered nests, it does however note the fostered chicks that resulted from the fostered nest. The last field notes located for Cavendish Sandspit were for the day the chicks were 23 days old, no data exists after this time for that beach.

Table 18a. Piping Plover nest and hatching success in Prince Edward Island National Park in the 1996 breeding season.

Beach	Number of nests	Number of nests fostered	Number of successful nests	Percent nest success	Number of successful nests fostered	Total Percent nest success	Number of eggs fostered	Number of eggs hatched	Percent hatching success	Number of fostered eggs hatched	Total Percent hatching success
Blooming Point	0	0	0	-	0	-	0	0	-	0	-
Covehead	6	0	3	50	0	50	0	12	54.55	0	54.55
Rustico Island Causeway ¹⁰	7	0	3	42.86	0	42.86	0	10	40.00	0	40.00
Rustico Island Sandspit	1	0	0	0	0	0	0	0	0.00	0	0.00
North Rustico	1	0	0	0	0	0	0	0	0.00	0	0.00
Cavendish Sandspit	11	0	5	45.45	0	45.45	0	18	48.65	0	48.65
Total	26	0	11	42.31	0	42.31	0	40	43.96	0	43.96

¹⁰The only variation from the 1996 report is that I was unable to verify that a 4th egg existed in a nest that was lost on Rustico Island Causeway. The field notes only ever state 3 eggs at that nest and only 3 eggs were found when that nest was flooded.

Table 18b. Piping Plover fledging success in Prince Edward Island National Park in the 1996 breeding season.
Nesting pair based on counts June 14.

Beach	Number of nesting pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/ pair (20 days)	Number of fostered chicks (20 days)	Total Fledging success/ pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/ pair (25 days)	Number of fostered chicks (25 days)	Total Fledging success/ pair (25 days)
Blooming Point	0	0	0	-	0	-	0	0	-	0	-
Covehead	5	5	7	1.40	0	1.40	5	7	1.40	0	1.40
Rustico Island Causeway	3	3	7	2.33	0	2.33	3	6	2.00	0	2.00
Rustico Island Sandspit	1	1	0	0.00	0	0.00	1	0	0.00	0	0.00
North Rustico	0	0	0	-	0	-	0	0	-	0	-
Cavendish Sandspit	5	5	14	2.80	0	2.80	5	13	2.60	0	2.60
Total	14	14	28	2.00	0	2.00	14	26	1.86	0	1.86

Table 19. Piping Plover nest and hatching success in Prince Edward Island National Park (1980-96)¹¹.

Beach	Number of nests	Number nests - known outcome	Number of successful nests	Percent nest success	Number of eggs	Number of eggs - outcome known	Number of eggs hatched	Total percent hatching success
Blooming Point	137	133	46	34.59	486	472	165	34.96
Tracadie Hbr	2	2	1	50.00	7	7	4	57.14
Dalvay east	1	1	1	100.00	4	4	4	100.00
Covehead	76	76	33	43.42	276	276	121	43.84
Shaw's	3	3	1	33.33	11	11	3	27.27
Brackley Bch.	5	5	1	20.00	20	17	1	5.88
Brackley Mn Bch	3	3	0	0.00	6	6	0	0.00
Rustico Is. Causeway	112	112	30	26.79	390	389	108	27.76
Rustico Is. Sandspit	25	24	11	45.83	102	99	41	41.41
North Rustico Bch	4	4	2	50.00	13	13	7	53.85
Cavendish Sandspit	213	211	76	36.02	755	744	284	38.17
Total	581	574	202	35.19	2070	2038	738	36.21

¹¹ Includes fostered nests and eggs.

Table 20. Piping Plover fledging success in Prince Edward Island National Park 1981, 1983-4, 1986-96.

Beach	Number of pairs	Number of pairs - outcome known (20 days)	Number of chicks (20 days)	Fledging success/pair (20 days)	Number of pairs - outcome known (25 days)	Number of chicks (25 days)	Fledging success/pair (25 days)
Blooming Point	85	50	75	1.50	42	40	0.95
Tracadie Hbr	2	1	4	4.00	1	4	4.00
Dalway east	1	0	-	-	0	-	-
Covehead	52	42	81	1.93	38	56	1.47
Shaw's	4	4	6	1.50	4	6	1.50
Brackley Bch.	5	2	0	0.00	2	0	0.00
Brackley Mn Bch	3	0	-	-	0	-	-
Rustico Is. Causeway	49	34	44	1.29	45	37	0.82
Rustico Is. Sandspit	19	14	13	0.93	13	10	0.77
North Rustico Bch	2	2	7	3.50	2	6	3.00
Cavendish Mn Bch	1	1	0	0.00	1	0	0.00
Cavendish Sandspit	106	87	160	1.84	82	149	1.82
Total	329	237	390	1.65	230	308	1.34

Table 21. Causes of Piping Plover egg loss in Prince Edward Island National Park (1980-96).

Beach	Washed out	Abandoned	Drifting sand	Predation								Adult Mort.	Human	Non-viable eggs ¹²	Multi. disturb.	Un-known	Total	Total Known
				Crow/ Raven	Avian	Gull	Fox	Skunk	Raccoon	Weasel	Mink							
Blooming Point	41	15	4	15	0	2	8	1	0	0	0	20	1	1	0	30	138	108
Tracadie Hbr	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Covehead	33	12	1	15	0	0	9	4	0	0	0	3	1	1 ¹³	0	15	94	79
Shaw's	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1
Brackley Bch.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Brackley Mn Bch	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2
Rustico Is. Causeway	39	12	16	9	0	1	4	2	1	0	0	4	1	2	0	35	126	91
Rustico Is. Sandspit	6	8	0	0	0	0	0	0	0	0	8	0	0	1	0	5	28	23
North Rustico Bch	0	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0	6	6
Cavendish Sandspit	71	29	35	5	7	3	34	0	0	1	0	12	1	6*	5	53	262	209
Total	197	80	56	45	7	6	55	7	1	1	8	39	5	12	5	141	665	524
Percent of known loss	37.60	15.30	10.71	8.60	1.34	1.15	10.52	1.34	0.19	0.19	1.53	7.46	0.96	2.29	0.96	n/a		
Total: 130; 24.86 %																		

¹²Non-viable eggs were verified by Atlantic Veterinary College.¹³Covehead non-viable excludes 1 fostered egg which was already counted as an abandoned egg.

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Ces séries de rapports serviront à :

- communiquer les résultats des recherches effectuées en sciences des écosystèmes aux scientifiques et aux gestionnaires, ainsi qu'aux membres du public que les activités entreprises par Parcs Canada en écologie et en conservation intéressent.
- offrir des publications professionnelles, crédibles et précises qui seront soumises à l'évaluation par les pairs.
- favoriser la diffusion de l'information, la créativité, l'efficacité et le travail d'équipe dans les projets de recherche.

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Le rédacteur nommera deux lecteurs choisis, dans la mesure du possible, parmi le personnel scientifique de Parcs Canada, qui seront chargés de faire une critique de chaque manuscrit. On fera appel à des lecteurs de l'extérieur en raison de l'expertise exigée, du temps disponible et de l'objectivité nécessaire. Les lecteurs renverront le manuscrit au rédacteur en y joignant leurs commentaires par écrit. Le rédacteur renverra le manuscrit à son ou à ses auteurs avec les commentaires des lecteurs. L'auteur prendra connaissance des commentaires et tiendra compte de ceux avec lesquels il est d'accord, puis il retournera le manuscrit révisé au rédacteur en lui expliquant par écrit pourquoi il n'a pas tenu compte de certains commentaires. Le rédacteur enverra ensuite le manuscrit au garde de parc en chef, ou, s'il s'agit d'employés du bureau régional, au superviseur immédiat de l'auteur, pour faire approuver la publication et l'impression du manuscrit. Dans le cas de publications de moindre importance, le rédacteur peut, à sa discrétion, décider de ne pas avoir recours à des lecteurs; lui-même et le superviseur immédiat de l'auteur serviront alors de lecteurs. En cas de désaccord entre l'auteur et le rédacteur au sujet du manuscrit, c'est le gestionnaire ministériel principal qui tranchera.

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